

REMARKS

Favorable reconsideration of this application is requested in view of the following remarks.

Applicants appreciate the Examiner's courtesy in having the telephone interviews on June 8, 2010 and August 3, 2010. The substance of the interviews is reflected in the amendments to the claims and discussion below.

Claim 46 has been added as a substitute of claim 1 to clarify the claim and further amended as supported by the specification at page 4, lines 18-25, page 5, lines 1-6, page 6, line 25 to page 7, line 5 and Fig. 2 and claim 17. Accordingly, claim 1 has been canceled without prejudice, claim 17 has been amended to remove the limitations included in claim 46, and claims 4, 9-12, 17-18, 20, 26, 44 and 45 have been amended editorially. Withdrawn claim 37 has been amended corresponding to claim 46, and withdrawn claims 39 and 41 have been amended editorially.

Claims 1, 4, 9-12, 17-18, 20, 26, and 44-45 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Kawamura et al. ("Growth of a large GaN single crystal using the liquid phase epitaxy (LPE) technique") in view of Sarayama et al. (U.S. Patent Application Publication No. 2002/0046695) and Yamada et al. (U.S. Patent No. 5,366,552). Applicants respectfully traverse this rejection.

Claim 46 recites a method in which a nitrogen-containing gas dissolves in the flux in which the Group III element dissolves so as to produce and grow the Group-III-element nitride single crystals on the seed substrate, and further recites that a continuous flow of the flux dissolving nitrogen-containing gas is provided across a surface of the substrate in a thin layer state so as to allow the nitrogen-containing gas to dissolve in the flux and supply nitrogen continuously to growth faces of the crystals by rocking the reaction vessel in a manner that the reaction vessel is tilted in at least one direction.

The rejection relies on Sarayama's disclosure that the dissolving nitrogen-containing gas flows continuously on a surface of the substrate due to a convection (see

para. [0246] on page 16). Sarayama discloses that the nitride crystal grows in the upper part or in a specific zone (see paras. [0144] and [0244]-[0245] on pages 8 and 16 and Figs. 5-8, 17, and 20A). The convection flow of the flux in Sarayama neither forms a thin layer nor flows in a thin layer state across the surface of a seed crystal. Thus, Sarayama fails to disclose that the flux in which the Group III element and nitrogen-containing gas dissolve flows across a surface of a seed substrate in a thin layer state so as to allow the nitrogen-containing gas to dissolve in the flux and supply nitrogen continuously to growth faces of the crystals as claim 46 recites.

The rejection further relies on Yamada's disclosure that the flux containing the Group III element and nitrogen-containing gas flows continuously on a surface of the substrate by rocking. Yamada discloses a method and an apparatus in which a solution filled in a solution chamber can move to a growth chamber through an opening of a gate valve, which usually separates the solution chamber and growth chamber and that the solution can return from the growth chamber to the solution chamber when the reaction vessel is rotated and the openings are aligned (see coln. 4, lines 9-56 and Figs. 1-4). Thus, in Yamada, the solution stays in the growth chamber while the crystals grow and returns to the solution chamber when the reaction vessel is rotated and the openings are aligned. Yamada thus fails to disclose that a continuous flow of the flux in which the Group III element and nitrogen-containing gas dissolve is provided across a surface of the substrate in a thin layer state so as to allow the nitrogen-containing gas to dissolve in the flux and supply nitrogen continuously to a growth face of the crystal by rocking the reaction vessel in a manner that the reaction vessel is tilted in at least one direction as claim 1 recites.

Accordingly, claim 46, which is a substitute claim of claim 1 and claims 4, 9-12, 17, 18, 20, 26, and 44-45, which ultimately depend from claim 46, are distinguished from Kawamura in view of Sarayama and Yamada, and this rejection should be withdrawn.

In view of the above, Applicants request reconsideration of the application in the form of a Notice of Allowance.



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DPM/my/jes

Respectfully submitted,

HAMRE, SCHUMANN, MUELLER &
LARSON, P.C.
P.O. Box 2902
Minneapolis, MN 55402-0902
(612) 453-3800

By: 

Douglas P. Mueller
Reg. No. 30,300